

# PATENT ABSTRACTS OF JAPAN

(11)Publication number : 01-214077

(43)Date of publication of application : 28.08.1989

(51)Int.Cl.

H01L 43/08  
G01R 33/06

(21)Application number : 63-039868

(71)Applicant : NEC CORP

(22)Date of filing : 22.02.1988

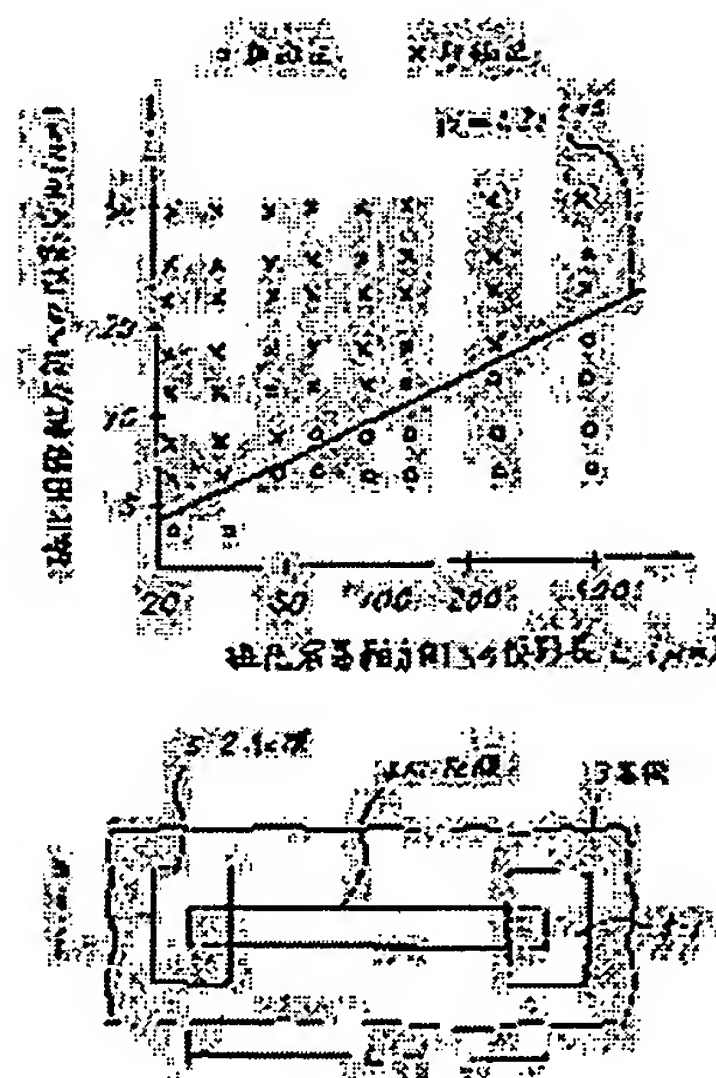
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## (54) MAGNETORESISTANCE ELEMENT

### (57)Abstract:

**PURPOSE:** To obtain an element in which Barkhausen noise which has seriously harmful influence upon the operation of a magnetic head and a magnetic sensor does not appear by a method wherein the projected length L to the easy-to-magnetize axis direction and the projected length W to the difficult-to-magnetize axis direction of a magnetoresistance effect film whose basic pattern is a parallelogram conform to a specific inequality.

**CONSTITUTION:** The projected length L to the easy-to-magnetize axis direction and the projected length W to the difficult-to-magnetize axis direction of a magnetoresistance effect film whose basic pattern is a parallelogram conform to an inequality  $0 < W < 1.2 \times L^{0.45}$ . For instance, an Ni-Fe film 4 with a thickness of  $0.04 \mu\text{m}$  is formed by vacuum evaporation on a substrate 3 obtained by oxidizing the surface of an Si chip to form a rectangular magnetoresistance effect film and Au films 5-1 and 5-2 are provided on both the ends of the rectangular film as electrodes. The magnetoresistance effect films with various long side lengths L and short side lengths W are experimentally produced and relations to the number of magnetic domains which are shown in the diagram are obtained. Therefore, if the shape of the magnetoresistance effect film conforms to the inequality  $0 < W < 1.2 \times L^{0.45}$ , a magnetic wall does not exist so that the Barkhausen noise of the magnetoresistance effect film can be eliminated.



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